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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/702,368	11/06/2003	William F. DiVergilio	02-IMP-068	8501

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EXAMINER	
ZERVIGON, RUDY	
ART UNIT	**PAPER NUMBER**
1763	

DATE MAILED: 07/06/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/702,368	DIVERGILIO ET AL.	
	Examiner	Art Unit	
	Rudy Zervigon	1763	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *18 April 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *13-29* is/are pending in the application.

4a) Of the above claim(s) *26-29* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *13-25* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *06 November 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

2. Claims 13-18, and 20-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Leung (US 6,888,146) in view of Moslehi (US 2001/0047760). Wth respect to Claim 13: Leung discloses an ion shower system (Fig. 3), comprising a plasma source operable to generate source gas ions within a chamber (Fig. 3, Item 13, Column 3 Lines 1-2), an extraction assembly associated with the chamber, and operable to extract source gas ions therefrom (Fig. 3 Item 14, Column 3 Lines 43-44).

Leung does not expressly state the plasma source fudher comprises: a plurality of conductor segments; a plurality of capacitors, wherein the conductor segments are serially connected through the plurality of capacitors, wherein the series arrangement of conductor segments and capacitors reside within the chamber; an antenna drive circuit coupled to the plurality of conductor segments, and operable to provide power to the conductor segments and capacitors at a predetermined frequency', and a source gas inlet, wherein the source gas inlet is operable to provide a source gas to the chamber, and wherein the conductor segments, capacitors and antenna drive circuit cooperatively provide energy to charged padicles in the chamber, thereby energizing the charged particles and generating a plasma comprising source gas ions and electrons within the chamber due to ionizing collisions between the energized charged padicles and the source gas.

Moslehi discloses an ion shower system (Fig. 22) wherein the plasma source fudher comprises: a plurality of conductor segments (Fig. 2 Items 186,190, and 196, Paragraph 57 Lines 9-12),* a plurality of capacitors (Fig. 3 Items 224 and 227, Paragraph 57 Lines 16-23), wherein the conductor segments are serially connected through the plurality of capacitors (Paragraph 57 Lines 19-22); an antenna drive circuit coupled to the plurality of conductor segments (Paragraph 57 Lines 22-23), and operable to provide power to the conductor segments and capacitors at a predetermined frequency (Paragraph 1 13 Lines 10-17),* and a source gas inlet (Fig. 22 Item 635), wherein the sourde gas inlet is operable to provide a source gas to the chamber (Fig. 22 Item 635), and wherein the conductor segments, capacitors and antenna drive circuit cooperatively provide energy to charged particles in the chamber, thereby energizing the charged particles and generating a plasma comprising source gas ions and electrons within the chamber due to ionizing collisions between the energized charged padicles and the source gas (Fig. 22). Leung and Moslehi are analogous art because they are from the same field of endeavor, namely semiconductor processing systems.

At the time of invention, it would have been obvious to a person of ordinal skill in the art to form Leung's ion shower including a plasma source further comprises: a plurality of conductor segments; a plurality of capacitors, wherein the conductor segments are serially connected through the plurality of capacitors; an antenna drive circuit coupled to the plurality of conductor segments, and operable to provide power to the conductor segments and capacitors at a predetermined frequency; and a source gas inlet, wherein the source gas inlet is operable to provide a source gas to the chamber, and wherein the conductor segments, capacitors and antenna drive circuit cooperatively provide energy to charged padicles in the chamber, thereby

energizing the charged padicles and generating a plasma comprising source gas ions and electrons within the chamber due to ionizing collisions between the energized charged padicles and the source gas in view of the teaching of Moslehi. The suggestion ormotivation for doing so would have been to provide a plasma source and gas inlet to the ion shower system of Leung as required but not disclosed. Further motivation would have been to provide a multi-zone high-density plasma source structure using at least two individually controlled coil segments for uniform plasma processing (Paragraph 13 Lines 2-4) as taught by Moslehi. Even though motivation is provided in this case, the substitution of equivalents requires no express motivation. In re Fount, 213 USPQ 532 (CCPA 1982)., In re Siebentritt 152, USPQ (CCPA 1967). Therefore, it would have been obvious to combine Leung with Moslehi to obtain the invention specified in Claim 13.

With respect to Claim 14: Leung discloses an Ion shower fudher comprising a workpiece support structure associated with the chamber (Fig. 3 Item 30), and operable to secure the workpiece for implàntation thereof of source gas ions from the extraction. With respect to Claim 15: Moslehi discloses a plasma source wherein the first and Iast conductor segments of the plurality of conductor segments form an input (Fig. 2 ltems 222 and 234), and wherein the antenna drive circuit is coupled to the input (Paragraph 57 Lines 22-23).

With respect to Claim 16: Moslehi discloses an ion shower, wherein the conductor segments have an inductive reactance associated therewith, and wherein the capacitors have a capacitive reactance associated therewith, and wherein one of the conductors and one of the capacitors form an antenna segment (Fig. 2 ltems 186, and 224), wherein the inductive reactance and capacitive

reactance of the antenna segment are equal at the predetermined frequency (Paragraph 1 13 Lines 13-17).

With respect to Claim 17.. Moslehi discloses an ion shower, wherein the plurality of conductor segments and plurality of capacitors form a resonant circuit at the predetermined frequency (Paragraph 1 13 Lines 13-17).

With respect to Claim 18: Moslehi discloses an ion shower, wherein the antenna drive circuit comprises an oscillator circuit (Fig. 22 ltems 608, 609, and 610., Paragraph 113 Lines 13-17).

Wth respect to Claim 20: Moslehi discloses an ion shower, wherein the plurality of conductor segments and capacitors are arranged within the chamber in an azimuthally symmetric fashion, wherein a non-uniform capacitive electrostatic field component along each conductor segment is repeated in an azimuthally symmetric fashion (Fig. 2 Items 186, 190, and 194).

Wth respect to Claim 21: Leung discloses an ion shower, wherein the extraction assembly is associated with a top podion of the chamber, and is operable to extract ions vertically from the top podion thereof (Fig. 3 Item 14, Column 3 Lines 43-44). With respect to Claim 22: Leung discloses an ion shower further comprising a workpiece support structure associated with the top podion of the chamber, and operable to secure the workpiece having an implantation su#ace orientated facing downward toward the extraction assembly for implantation thereof (Fig. 3 Item 30 Column 2 Lines 58-60).

Claims 13, and 23-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Collins (US 6,068,784) in view of Moslehi (US 2001/0047760). Wth respect to Claim 13: Collins discloses an ion shower system (Fig. 1 Item 10), comprising a plasma source operable to generate source gas ions within a chamber (Fig. 1, Item 10, Column 6 Lines 62-68), a source gas

inlet (Fig. 2 ltem 56, Column 10 Lines 5-6), and an extraction assembly associated with .the chamber, and operable to extract source gas ions therefrom (Column 8 Lines 58-60). Collins does not expressly state the plasma source fudher comprises: a plurality of conductor segments; a plurality of capacitors, wherein the conductor segments are serially connected through the plurality of capacitors; an antenna drive circuit coupled to the plurality of conductor segments, and operable to provide power to the conductor segments and capacitors at a predetermined frequency', and a source gas inlet, wherein the source gas inlet is operable to provide a source gas to the chamber, and wherein the conductor segments, capacitors and antenna drive circuit cooperatively provide energy to charged padicles in the chamber, thereby energizing the charged particles and generating a plasma comprising source gas ions and electrons within the chamber due to ionizing collisions between the energized charged particles and the source gas. Moslehi discloses an ion shower system (Fig. 22) wherein the plasma source further comprises: a plurality of conductor segments (Fig. 2 ltems 186,190, and 196, Paragraph 57 Lines 9-12)., a plurality of capacitors (Fig. 3 Items 224 and 227, Paragraph 57 Lines 16-23), wherein the conductor segments are serially connected through the plurality of capacitors (Paragraph 57 Lines 19-22)*, an antenna drive circuit coupled to the plurality of conductor segments (Paragraph 57 Lines 22-23), and operable to provide power to the conductor segments and capacitors at a predetermined frequency (Paragraph 1 13 Lines 10-17); and a source gas inlet (Fig. 22 Item 635), wherein the source gas inlet is operable to provide a source gas to the chamber (Fig. 22 ltem 635), and wherein the conductor segments, capacitors and antenna drive circuit cooperatively provide energy to charged particles in the chamber, thereby energizing the charged padicles and generating a plasma comprising source gas ions and electrons within the

chamber due to ionizing collisions between the energized charged particles and the source gas (Fig. 22). Collins and Moslehi are analogous art because they are from the same field of endeavor, namely semiconductor processing systems.

At the time of invention, it would have been obvious to a person of ordinary skill in the art to form Collins's ion shower including a plasma source further comprises: a plurality of conductor segments; a plurality of capacitors, wherein the conductor segments are serially connected through the plurality of capacitors', an antenna drive circuit coupled to the plurality of conductor segments, and operable to provide power to the conductor segments and capacitors at a predetermined frequency; wherein the source gas inlet is operable to provide a source gas to the chamber, and wherein the conductor segments, capacitors and antenna drive circuit cooperatively provide energy to charged particles in the chamber, thereby energizing the charged padicles and generating a plasma comprising source gas ions and electrons within the chamber due to ionizing collisions between the energized charged padicles and the source gas in view of the teaching of Moslehi. The suggestion or motivation for doing so would have been to provide a multi-zone high-density plasma source structure using at Ieast two individually controlled coil segments for uniform plasma processing (Paragraph 13 Lines 2-4). Even though motivation is provided in this case, the substitution of equivalents requires no express motivation. In re Fount, 213 USPQ 532 (CCPA 1982),' In re Siebentritt 152, USPQ (CCPA 1967). Therefore, it would have been obvious to combine Collins with Moslehi to obtain the invention specified in Claim 13. Wth respect to Claim 23: Collins discloses an ion shower, wherein the chamber fudher comprises a bottom portion and side portions (Fig. 13 Item 77,* Column 15 Lines 56-57), and wherein the side portions comprise a plurality of multi-cusp magnet devices operable to produce multi-cusp

magnetic fields thereat to facilitate an azimuthal uniformity of plasma within the chamber (Fig. 13 Item 77., Column 15 Lines 56-57). With respect to Claim 24: Collins discloses an ion shower, wherein the multi-cusp magnet devices comprise electromagnets operable to provide a variation in multi-cusp magnetic field strength at differing positions along the side portions (Fig. 3 Item 47; Column 9 Lines 10-15).

With respect to Claim 25: Collins discloses an ion shower, wherein the electromagnets are independently controllable, thereby facilitating a tuning of the multi-cusp magnetic fields (Column 17 Lines 8-12).

3. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Leung (US 6,888,146) in view of Moslehi (US 2001/0047760) as applied to claim 13 above, and further in view of Markunas (US 6,552,295). Wth respect to Claim 19.. Leung in view of Moslehi discloses an ion shower in accordance with claim 18. Leung in view of Moslehi does not expressly state the oscillator circuit comprises a push-pull type oscillator circuit.

Markunas discloses an oscillator circuit comprising a push-pull type oscillator circuit. Leung, Moslehi and Markunas are analogous ad because they are from the same field of endeavor, namely systems that use RF oscillator circuits.

At the time of invention it would have been obvious to a person of ordinary skill in the art to form the ion shower of Leung in view of Moslehi to include an oscillator circuit comprising a push-pull oscillator circuit in view of the teaching of Markunas. The suggestion or motivation for doing so would have been to provide a oscillator circuit to the ion shower system of Leung in view of Moslehi as required but not disclosed. Therefore, it would have been obvious to combine Leung in view of Moslehi with Markunas to obtain the invention specified in Claim 19.

Response to Arguments

4. Applicant's arguments with respect to claims 13-25 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

5. Applicant's amendment necessitated the new grounds of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Rudy Zervigon whose telephone number is (571) 272-1442. The examiner can normally be reached on a Monday through Thursday schedule from 8am through 7pm. The official fax phone number for the 1763 art unit is (571) 273-8300. Any Inquiry of a general nature or relating to the status of this application or proceeding should be directed to

the Chemical and Materials Engineering art unit receptionist at (571) 272-1700. If the examiner can not be reached please contact the examiner's supervisor, Parviz Hassanzadeh, at (571) 272-1435.